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CLAIMS 1-28. (CANCELLED)

29. (Currently Amended) A semiconductor device manufacturing method comprising the steps of:

converting into a plasma a process gas consisting essentially of ~~containing~~ N_2O and a hydrocarbon C_xH_y;

forming ~~nitriding a surface portion of a copper wiring layer to convert the surface portion into~~ a copper diffusion preventing layer by exposing a surface of the copper wiring layer to the process gas plasma.

30. (Previously Presented) A semiconductor device manufacturing method according to claim 29, wherein N_2 is added to the process gas.

31. (Previously Presented) A semiconductor device manufacturing method according to claim 29, further comprising the step of:

before converting the process gas into the plasma, exposing the surface of the copper wiring layer to a NH_3 plasma to remove surface oxide from the copper wiring layer.

CLAIM 32. (CANCELLED)

33. (Previously Presented) A semiconductor device manufacturing method according to claim 32, further comprising the step of:

converting into a second plasma a process gas containing at least one of NH_3, N_2, and N_2O;and

exposing the silicon-containing insulating layer to the second process gas plasma.

34. (Previously Presented) A semiconductor device manufacturing method according to claim 32, further comprising the steps of:

forming an interlayer insulating film on the silicon-containing insulating film;

forming a via hole in the silicon-containing insulating film and the interlayer insulating film;

burying a plug, electrically connected to the copper wiring, in the via hole; and

forming an upper wiring layer, electrically connected to the plug, on the interlayer insulating film.

35. (Previously Presented) A semiconductor device manufacturing method according to claim 34, wherein the interlayer insulating film is a FSG film or a porous SiO_2 film.

36. (Previously Presented) A semiconductor device manufacturing method according to claim 32, wherein the silicon-containing insulating layer is selected from the group consisting of a SiOCH layer, a SiCH layer, a SiO layer, a SiN layer, a SiONCH layer, and a SiCNH layer.

37. (Previously Presented) A semiconductor device manufacturing method according to claim 36, wherein the silicon-containing insulating layer is a SiOCH film formed by chemical vapor deposition using a reaction gas containing a compound having siloxane bonds.

38. (Previously Presented) A semiconductor device manufacturing method according to claim 36, wherein the silicon-containing insulating layer is a SiONCH film formed by chemical vapor deposition using a reaction gas containing a compound having siloxane bonds and N_2O.

39. (Previously Presented) A semiconductor device manufacturing method according to claim 38, wherein the compound having the siloxane bonds is selected from the group consisting of HMDSO ($(Si(CH_3)_3)_2O$), OMCTS ($(Si(CH_3)_2)_4O_4$), HEDS ($(Si(C_2H_5)_3)_2O$), TMDS ($(SiH(CH_3)_2)_2O$), TEDS ($(SiH(C_2H_5)_2)_2O$), TMCTS ($(SiH(CH_3))_4O_4$), and TECTS ($(SiH(C_2H_5))_4O_4$).

40. (Previously Presented) A semiconductor device manufacturing method according to claim 36, wherein the silicon-containing insulating layer is a SiN film formed by

chemical vapor deposition using a reaction gas containing SiH_4 and N_2O.

41. (Previously Presented) A semiconductor device manufacturing method according to claim 40, wherein NH_3 is added to the reaction gas.

42. (Previously Presented) A semiconductor device manufacturing method according to claim 36, wherein the silicon-containing insulating layer is a SiO film formed by chemical vapor deposition using a reaction gas containing an organic silane.

43. (Previously Presented) A semiconductor device manufacturing method according to claim 42, wherein the organic silane is TMS ($Si(CH_3)_4$).

44. (Previously Presented) A semiconductor device manufacturing method according to claim 36, wherein the silicon-containing insulating layer is a SiCH film formed by chemical vapor deposition using a reaction gas containing organic silane and hydrocarbon.

45. (Previously Presented) A semiconductor device manufacturing method according to claim 44, wherein the hydrocarbon is CH_4 or C_2H_2.

46. (Previously Presented) A semiconductor device manufacturing method according to claim 36, wherein the silicon-containing insulating layer is a SiCNH film formed by chemical vapor deposition using a reaction gas containing NH_3, organic silane, and

hydrocarbon.

47. (Previously Presented) A semiconductor device manufacturing method according to claim 37, wherein the compound having the siloxane bonds is selected from the group consisting of HMDSO ($(Si(CH_3)_3)_2O$), OMCTS ($(Si(CH_3)_2)_4O_4$), HEDS ($(Si(C_2H_5)_3)_2O$), TMDS ($(SiH(CH_3)_2)_2O$), TEDS ($(SiH(C_2H_5)_2)_2O$), TMCTS ($(SiH(CH_3))_4O_4$), and TECTS ($(SiH(C_2H_5))_4O_4$).